

# aeromet

SEASONAL PROGRESS REPORT NO. 3 for the period September, October and November 1976

to

ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
1860 Lincoln St., Suite 900
Denver, CO 80203

Contract No. 68-01-1946

aeromet inc.

P.O. BOX FF

NORMAN, OKLAHOMA 73070 405 329-2424

N U82 V448

USMIS LIBRARY CONTROL NO. 010081169



# 8806 4809

D-553A, Buildine \*4
Denver Federal
P. O. Box 25047
Denver, CO 80225-0047

SEASONAL PROGRESS REPORT NO. 3

for the period

September, October and November 1976

to

ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
1860 Lincoln St., Suite 900
Denver, CO 80203

Contract No. 68-01-1946

by

Aeromet, Inc. P.O. Box FF Norman, OK 73070 ELM ELEVELES -- PART | PART |

#### 1.0 INTRODUCTION

Low level temperature and wind data were collected for the fall season of September, October and November 1976 at Casper, Wyoming; the Colorado C-b Tract 25 miles west of Rio Blanco, Colorado; Craig, Colorado; Escalante and Hanksville, Utah; Rock Springs, Wyoming; and the U-a/U-b Tract 5 miles south of Bonanza, Utah. The collection of data at the U-a/U-b site commenced October 1, 1976 and will continue through 30 September, 1977. The data were collected using a 30 gm helium filled pilot balloon with a temperature sonde attached, a single theodolite and a TSR-2 receiver/recorder twice a day every other day. The observations were made ½ hour after sunrise and at 1400L.

The pilot balloon had an ascent rate of 500 ft/min and it was tracked by a single theodolite for 12 minutes with the azimuth and elevation angles recorded every 30 seconds on a cassette tape recorder. The tape was transcribed to a pilot balloon form after the observation.

The temperature sonde operated at 403 MHz and the signal was received by a ground plane antenna at least 24 ft. AGL which was attached to the Aeromet, Inc. TSR-2 receiver/recorder. The TSR-2 receiver has a built-in Rustrak strip chart recorder and the temperature was recorded within the range from -50°C to +50°C. A baseline temperature calibration was performed with each T-Sonde by the adjustment of the recorded temperature to match the thermometer measured temperature next to the transmitting sonde. Once the calibration check was finished the balloon was released with the sonde attached and the temperature was recorded for at least 20 minutes. At the completion of each observation the data were mailed to Aeromet, Inc.

The Annual Progress Report is divided into seven parts, one corresponding to each of the seven field sites. The temperature and wind data were not edited after the completion of the Monthly Progress Reports.



#### 2.1 Mixing Layer Height

The average mixing layer height was computed for the morning and afternoon based on the morning and 1400L temperature soundings. balloon release behour after sunrise is near enough to the minimum temperature to assume the correctness of the calculated mixing layer heights. The afternoon balloon release is generally not at the time of maximum heating and the user of the mixing layer height data must be aware that minor changes in the calculated values can be expected. Without equipping the field sites with minimum/maximum thermometers the extrapolation of the afternoon data cannot be justified in establishing a data base for statistical analysis. The approximation of the afternoon maximum temperature would be a "calculated guess" for there are: 1) local effects which are to be determined and would be filtered out with extrapolation, 2) mountain effects which alter the lower 1500m (e.g. downslope effects), and 3) meteorological effects which can alter the expected change in the sounding (e.g. advection, moisture, etc.).

It is felt that to better define the mixing layer height a variety of "heat island" effects should be viewed. The rigourous method would be to define 15 "heat island" effects ranging from 0 to 14°C and let the user decide which would best serve his needs. However, for this analysis 0°, +5° and +10° "heat island" effects are calculated and listed for the morning and afternoon soundings in the table Average Mixing Layer Height.

A summary of the average mixing layer heights calculated with the 0°, +5° and +10° "heat island" effects for each of the six field sites for the fall season of September, October and November are included in the report. The percent of occurrence of the average height within 250m increments above ground level is given in tabular form. The total number of soundings included in the sample populations are listed in the table.

## 2.2 Stability and Inversion Classification

The temperature and wind data were edited to remove data felt to cause anomalous results in the stability and inversion classification schemes. Only the stations listed prior to the table classifying the inversions were used in the calculations.

The temperature data are processed to produce for each site a seasonal summary of inversion layers and lapse rates within the inversions and from the inversion base to the surface by means of the Holzworth classification scheme for inversions (Holzworth, G. C., 1974: "Climatological Data on Atmospheric Stability in the United States" paper presented at the American Meteorological Society Symposium on Atmospheric Diffusion and Air Pollution, September 9-13, 1974, Santa Barbara, California.)

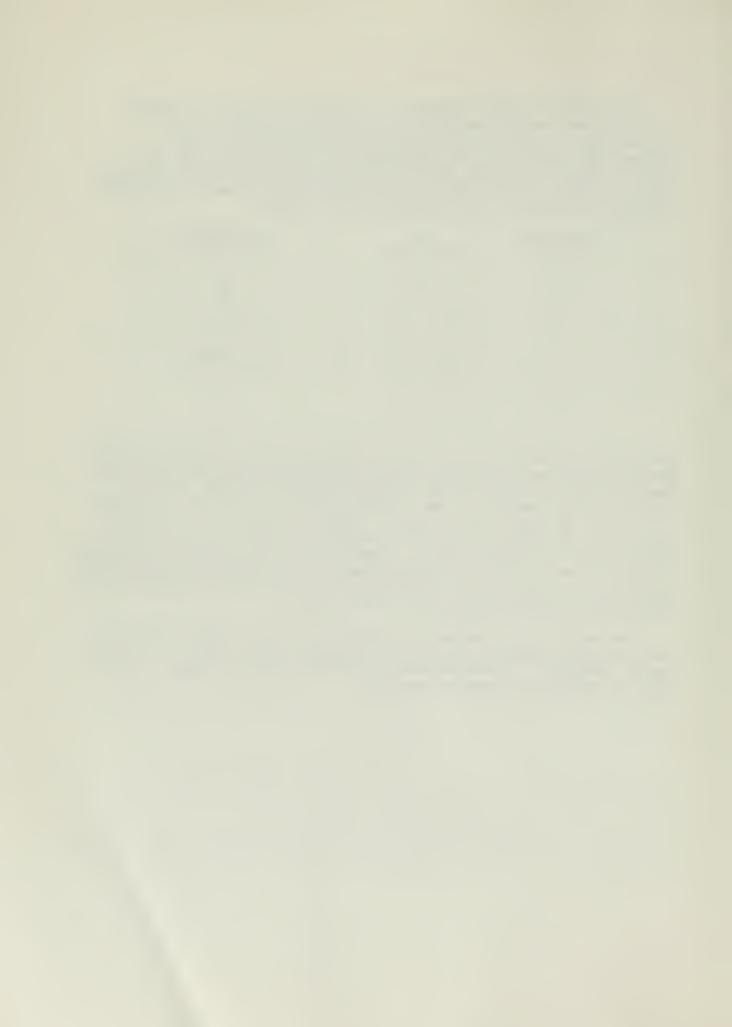


The temperature and wind data are processed together to produce for each site a monthly average bivariate frequency distribution of wind direction versus wind speed represented in the 500m layer adjacent to the ground. The distribution is presented by the six Pasquill stability classes (A-F) and a summary independent of stability. If the  $\Delta T/100m$  criterion is met but the wind speed criterion is not met, then the wind data are checked against the criterion

STABILITY CLASS	∆T (°C/100m)	WIND SPEED (m s <sup>-1</sup> )
А	<-1.9	≤2
В	-1.91.7	≤5
С	-1.71.5	≤6
D	-1.50.5	ALL SPEEDS
E	-0.5 - 1.5	≤5
F	>1.5	≤3

for the next stability class, always cascading to the D stability class. Once the wind speed criterion is met the data are classified under the new stability class even though now the lapse rate exceeds the class criterion. For example, if the  $\Delta T/100\text{m}$  value is 1.7 and the wind speed is 7 m s^1, the lapse rate criterion is met for the stability class F, however the wind speed criterion is exceeded. The wind speed is greater than the 5 m s^1 maximum limit for class E but falls within the criterion of class D, which includes all wind speeds. As a result the observational data with a  $\Delta T$  value of 1.7°C/100m and a wind speed value of 7 m s^1 are classified under stability class D, not class F.

The data are also punched on computer cards in a format compatible with the STAR PROGRAM of the National Climatic Center, NOAA, U.S. Department of Commerce. A detailed description of the punched output can be found in the Monthly Progress Reports.



### AVERAGE MIXING LAYER HEIGHT

### Colorado C-b Tract

Season: September, October, November

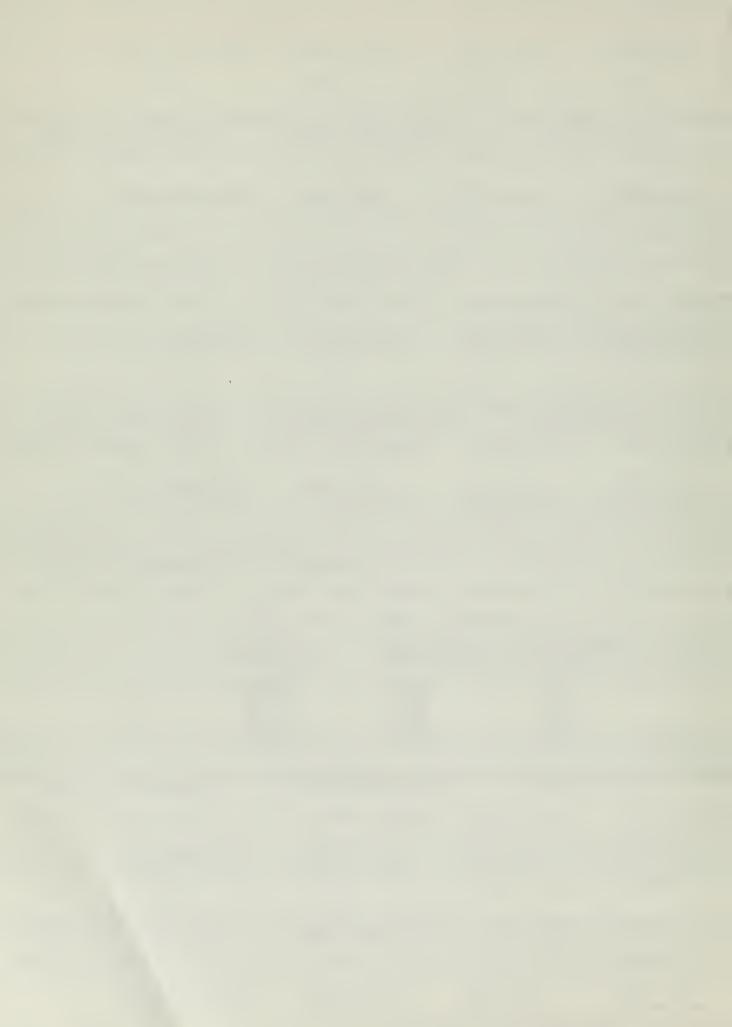
MIXING LAYER HEIGHT		PERCENT OF OCCURRENCE									
(Height in meters)		MORNING	ì	AFTERNOON							
	0.	+5.	+10°	0.	+5.	+10.					
surface	59.3			34.8							
1 - 250m	29.6	3.7		21.7							
251 - 500m	7.4	18.5		4.3	4.3						
501 - 750m	3.7	18.5	3.7	13.0	4.3						
751 - 1000m		22.2	7.4	8.7	8.7						
1001 - 1250m		14.8	3.7		4.3	4.3					
1251 - 1500m		7.4	11.1	4.3	17.4						
1501 - 1750m		3.7	14.8	13.0	8.7	8.7					
1751 - 2000m			11.1		13.0	4.3					
> 2000m		3.7	29.6		34.8	47.8					
None defined		7.4	18.5		4.3	34.8					
TOTAL NUMBER	27	27	27	23	23	23					



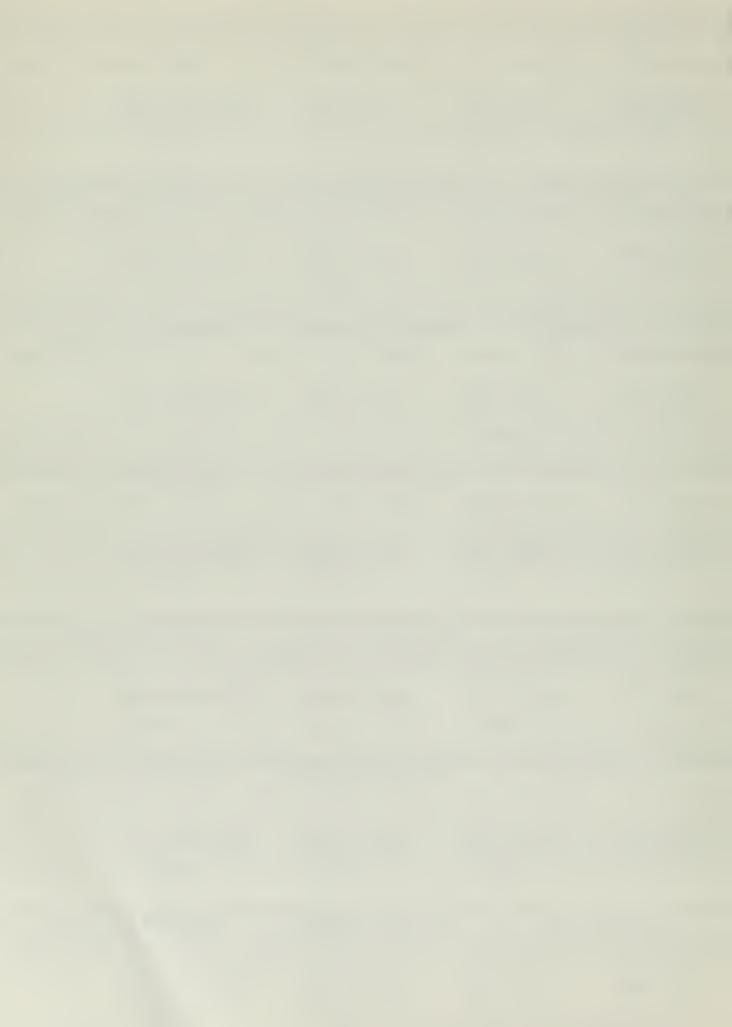
**		************ Thaci				************	
DATE	09/01/76	TIME 06:30MST	ASCENT	RATE 500	FPM	DATA INTERVA	AL 15 SEC.
	INV BASE METERS AGL	METERS AGL	OEG	C)/100M	0110	FC C)/100M	
	56.	70.	**************************************	0,24	/a 2	-0,24	
***	CUL Cb	TRACT	**********	METERS	*****	SOUNDING TO	2011
DATE	09/01/76	TIME 12:00MST	ASCENT	HATE 500	FPM	DATA INTERVI	AL 15 SEC.
1	INV BASE METERS AGL	METERS AGL	(DEG	C)/100m	UNTO	EG C)/100H	
-	634,	672.		0.0	,	-0.73	
***	CUL GB	************* TRACT	********* ELEV 2042	METERS	*****	**************************************	1941
DATE	09/05/76	TIME 06:30MST	ASCENT	RATE 500	FPM .	DATA INTERVA	AL 15 SEC.
	INV BASE METERS AGL	INV TUP METERS AGL	IN ODEG	C)/100M	QVTQ Q)	Z BELOW INV	
	459.	574.		0.08		-0.78	; 4, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
***	CUL CB	************* TRACT	**************************************	METERS*	*****	**************************************	1227
DATE		TIME 13:00MST					AL 15 SEC.
		ARE NO INVERSER BASE LA					
	MEI	0	100.		0.63	( )	
	**	100. 250. 500.	250 500 750	*	0.87 0.63 0.59		
		750. 1000:	1500.	-	0.71		
***	COL (6	*****************************	**********	*******	*****	**************************************	********** 992
DATE	09/07/76	TIME 07:00MST	ASCENT	RATE 500	F P N	DATA INTERVA	AL 15 SEC.
	INV BASE METERS AGL	INV TUP METERS AGL	OEG	C)/100M	0170 0)	Z BELUM INV EG CIVIOOM	
·	229.	267,		0 . 0		-0.48	
***	CUL CB	TRACT	********	********	*****	************ SOUNDING ID	* * * * * * * * * * * * * * * * * * *
DATE	. 09/07/76	TIME 12:00MST	ASCENT	RATE 500	FFM	DATA INTERVA	15 SEC.
	INV BASE METERS AGL	1MV TUP	. (DEG	C)/100M		EG C)/100H	
	0.	38.	•	0.0		0.0	



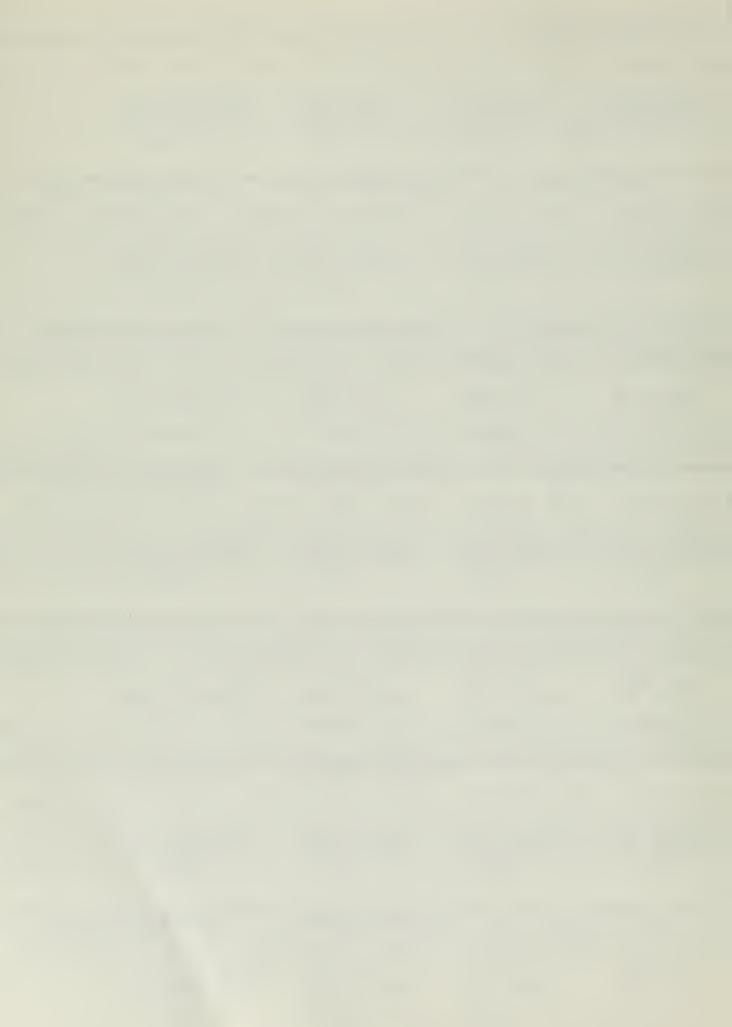
```
(IIL CH INALI
                         TELLY CUIC ETEND
                                               5/6 01 10 22/9
DATE 09/09/76 TIME 07:000ST ASCHOT PATE SOU FEE
                                               DATA INTERVAL 15 SEC.
                             (DEG C)/100m OF/DZ BELUM INV
   INV HASE
                 Inv TUP
  METERS AGL
                MFTERS AGL
                                   0.28
                                                  0.0
                   207.
        U.
ELEV 2042 METERS
                                                SUUNDING ID 2368
            TIME 12:00MST ASCENT RATE 500 FPH DATA INTERVAL 15 SEC.
TATE 09/09/76
                             THE DIADY DIADY (DEC C) / 100H
  INV HASE
METERS AGL
                  INV TUP
                METERS AGL
                                   4.72
                                                   0.0
        0.
                     38.
      DATE 09715/76 TIME 06: LOMST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.
                            INV DI/DZ DI/DZ BELOW INV
                 INV TUP
   INV BASE
  METERS AGE
              METERS AGL
                                                  -0.24
                     70.
                                   0.0
       38.
                          SCHUNDING ID 2523
       CUL CE TRACT
DATE 09/15/76 TIME 13:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.
                              INV DI/DZ DI/DZ BFLUW INV (DEG C)/100M
                  INV TUP
   INV BASE
  MÉTERS AGE.
               METERS AGL
                                                  -1,49
                                   0.0
      218.
                    256.
                          ELEV 2042 METERS
                                                SUUNDING ID 2567
       COL CB TRACT
                                               DATA INTERVAL 15 SEC.
DATE 09/17/76 TIME 08:30MST -ASCENT WATE 500 FPM
        THERE ARE NO INVERSION BASES WITHIN 1500M OF THE SEC
          LAYER BASE LAYER TUP
METERS AGL METERS AGL
                                         DITUZ
                                     (DEG C)/100M
                                         -1,20
-0,51
-0,93
-0,94
                            100.
250.
              100.
                            500.
              250.
              500.
                                         -0.98
-0.94
                            OUU.
               750.
                           1500.
              1000.
CUL CB TRACT ELEV 2042 NETERS SOUNDING ID 2406
                           ASCENT HATE SOU FPM DATA INTERVAL 15 SEC.
DATE 09/17/76
             TIME 14:45MST
                            (DEC C)/100m (DEC C)/100m
                  INV TUP
   INV BASE
METERS AGL
                METERS AGL
                                                  -0.68
                                    0.0
                     457.
      505.
                          SUUNDING ID
       CUL CH TRACT
DATE 09/21/76 TIME 06:45MST ASCENT HATE 500 FPM DATA INTERVAL 15 SEC.
                                            D1/D2 BELUM INV
                                INV DT/DZ
                INV TUP
METERS AGL
    INV BASE
                              (DEG ()/100M
   METERS AGL
                                                   U.U
                    419
```



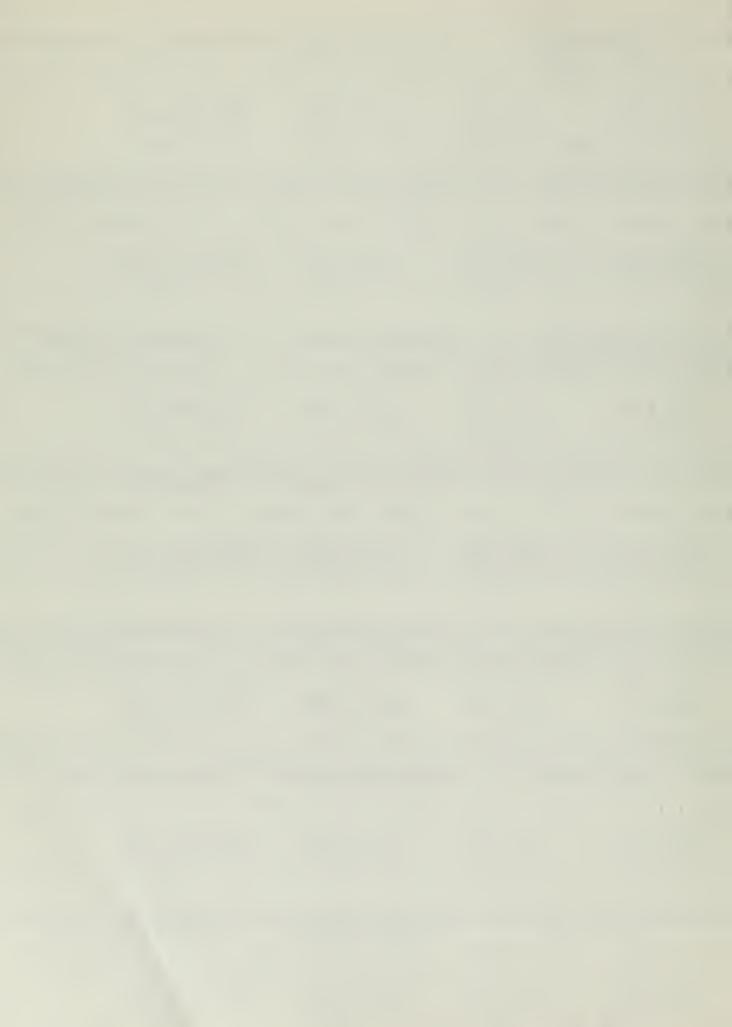
		***	********	*********
CUL CE	STRALT	ELEV 2042 METERS	SUUNDI 46 ID	0
DATE 09/21/76	1176 12:50%51	ASLENI KATE 500	FPM DATA INTERVA	r 15 9rr.
1NV BASE METERS AGL	METERS AGL	DEG C)/100m	DIVOR DEFINE INA	
191,	229.	0.0	-0.61	
************	*********	**************************************	SOUNDING ID	*********
			FPM DATA INTERVA	
INV BASE METERS AGE	INV TUP METERS AGL	1 NV DT/DZ (DEG C)/100M	DT/DZ BELOW INV	
0.	38,	0,0	0.0	**************************************
**************************************	************	1 ***************** ELEV 2042 METERS	SOUNDING ID	********
DATE 09/23/76	TIME 13:00MST	ASCENT RATE 500	FPM DATA INTERVA	L 15 SEC.
INV BASE METERS AGL	INV TUP	INV OT/DZ (DEG C)/100M	DIVOZ BELOW INV	
991	1029.	0.0	=0,52	
********	*************	**************************************	*************	*********
			FPM DATA INTERVA	
INV BASE METERS AGL	1NV TUP	INV DT/DZ (DEG C)/100M	DINDS REFOR INA	
38.	648.	0.03	-0,50	
*******	**************************************	LEV 2042 METERS	*************	********
			FPM DATA INTERVA	
INV BASE METERS AGL	INV TUP	1NV D1/DZ (DEG C)/100M	DT/DZ BELUM INV	
114.	495.		-0.41	
******	****	*******	**************************************	******
			FPM DATA INTERVA	
INV BASE METERS AGL	METERS AGL	1 NV DT/DZ (DEG C)/100M	OT/DZ BFLOW INV	
76.	152,	0.0	÷0,38	
*******	*********	1 * * * * * * * * * * * * * * * * * * *	*****************************	/ /***********************************
			FPM DATA INTERVA	
INV BASE METERS AGL	INV TUP METERS AGL	INV 07/DZ (0EG C)/100M	DT/DZ BELOW INV	`
76.	194.	0.0	-0.37	•



* *	(************ (***********************	* * * * * * * * * * * * * * * * * * *	****************** FLEV DDB2 METERS	**************************************	**************************************
DAT				FPM DATA INTERVAL	
	INV BASE METERS AGE	INV TUP METERS AGL	1NV 01/02 (DEG C)/100M	UT/OZ BELOW INV .	
	0.	.58		0.0	
* *	************	*****	女士大大大大大大大大大大大大大大大   C   C   C   C   C   C   C   C   C   C	**************************************	* * * * * * * * * * * * * * * * * * *
DAT				FPM DATA INTERVA	
	INV BASE METERS AGL	INV TUP METERS AGL	INV DI/DZ (DEG C)/100M	DIADS BELOW IMA	
	787.	825.	0.0	-1.00	
**	**********	**************************************	**************************************	SOUNDING ID	*******
DAT				FPM DATA INTERVAL	
	INV BASE METERS AGL	INV TUP METERS AGL	INV DI/DZ	OT/DZ BELOW INV (DEG C)/100M	·
	38.	381.		÷ -0.76	•
**	**********	****	****	**************************************	****
DAT			•	FPM DATA INTERVAL	
	INV BASE METERS AGL	1NV TUP METERS AGL	1NV 01/02 (DEG C)/100m	OFC C)/100M	
	INV BASE METERS AGL 1418.	METERS AGL	1NV DI/DZ (DEG C)/100M	OT/DZ BELOW INV (DEG C)/100M	,
**	METERS AGE	METERS AGL 1457.	(DEG C)/100M	(OEG C)/100M	*****************************
	METERS AGE 1418. ***************	METERS AGL 1457. TRACT	(DEG C)/100M 0.0 ********************************	(OEG C)/100M	-
	METERS AGL 1418. ************************************	METERS AGL 1457. 1457. TRACT TRACT	(DEG C)/100M 0.0 ********************************	(DEG C)/100M  -0.96  ***********************************	-
	METERS AGL 1418. ************************************	METERS AGL 1457. 1457. TRACT TIME 12:45MST  NETERS AGL	(DEG C)/100M 0.0 ********************************	(DEG C)/100M  -0.96  ***********************************	-
DAT	METERS AGL  1418.  *************  CUL CB  E 10/28/76  INV BASE METERS AGL  449.	METERS AGL 1457. 1457. TRACT TIME 12:45MST  NETERS AGL 040.	(DEG C)/100M 0.0 *********************************	(DEG C)/100M  -0.90  ****************  SOUNDING ID  FPM DATA INTERVAL  DT/DZ BELUM INV (DEG C)/100M	. 15 SEC.
DAT	METERS AGL  1418.  ************  CUL CB  E 10/28/76  INV BASE METERS AGL  449.  ********************************	METERS AGL 1457. 1457. TRACT TIME 12:45MST  METERS AGL 640.  ***********************************	CDEG C)/100M  0.0  ******************  ASCENT RATE 500  INV DT/DZ (DEG C)/100M  1.26  ***********************************	(DEG C)/100M  -0.96  ***********************************	A*************************************
DAT	METERS AGL  1418.  *************  CUL CB  E 10/28/76  INV BASE METERS AGL  449.  *************  CUL CB  E 10/30/76	METERS AGL 1457. 1457. TRACT TIME 12:45MST  METERS AGL 640.  ***********************************	(DEG C)/100M 0.0  ********************  ASCENT RATE 500  INV DT/DZ (DEG C)/100M 1.26  ***********************************	**************  DI/DZ BELUM INV (DEG E)/100M  DI/DZ BELUM INV (DEG E)/100M  -1.04  ***********************************	A*************************************
DAT	METERS AGL  1418.  *************  CUL CB  E 10/28/76  INV BASE METERS AGL  449.  *************  CUL CB  E 10/30/76	METERS AGL 1457. 1457. TRACT TIME 12:45MST  METERS AGL 640.  ***********************************	(DEG C)/100M 0.0  ********************  ASCENT RATE 500  INV DT/DZ (DEG C)/100M  1.26  ***********************************	**************  DI/DZ BELUM INV (DEG E)/100M  DI/DZ BELUM INV (DEG E)/100M  -1.04  ***********************************	A*************************************
DAT	METERS AGL  1418.  ************  CUL CB  E 10/28/76  INV BASE METERS AGL  449.  *************  CUL CB  E 10/30/76  INV BASE METERS AGL  294.  ***********************************	METERS AGL  1457.  1457.  TRACT  TIME 12:45MST  PRIERS AGL  640.  TRACT  TIME 08:00MST  INV TUP  METERS AGL  332.	(DEG C)/100M 0.0  ********************  ASCENT RATE 500  INV DT/DZ (DEG C)/100M  1.26  ***********************************	COEG C)/100M  -0.96  ******************  SOUNDING ID  FPM DATA INTERVAL  DT/DZ BELOW INV (UEG C)/100M  -1.04  ***********************************	15 SEC.
DAT	## TERS AGL  1418.  ************  CUL CB  E 10/28/76  INV BASE METERS AGL  449.  ************  CUL CB  E 10/30/76  INV BASE METERS AGL  294.  ***********************************	METERS AGL  1457.  1457.  TRACT  TIME 12:45MST  METERS AGL  640.  ***********************************	(DEG C)/100M 0.0  ************************  ASCENT HATE 500  INV DT/DZ (DEG C)/100M 1.26  ***********************************	COEG C)/100M  -0.96  ******************  SOUNDING ID  FPM DATA INTERVAL  DT/DZ BELOW INV (UEG C)/100M  -1.04  ***********************************	15 SEC.  A*************  15 SEC.
DAT	METERS AGL  1418.  *************  CUL CB  E 10/28/76  INV BASE METERS AGL  449.  **************  CUL CB  E 10/30/76  INV BASE METERS AGL  294.  ***********************************	METERS AGL  1457.  1457.  TRACT  TIME 12:45MST  METERS AGL  040.  ********************************	(DEG C)/100M 0.0  ************************  ASCENT HATE 500  INV DT/DZ (DEG C)/100M 1.26  ***********************************	COEG C)/100M  -0.96  ***********************************	15 SEC.  A*************  15 SEC.



*********	1 * * * * * * * * * * * * * * * * * * *	・************************************	rakakkkka Posters	*****	********* Shunding ii	********* 5 3158	* * * * *
	TIME UB: UB ST						
INV BASE METERS AGL	INV TUP METERS AGL	INV	D1/D2	01/DZ	G C)/100m		
0.	305.		0.28		0.0		
. COL CE		ELEV 2042	METERS	•	SUDMOTHP 1		***
.UATE 11/05/76				- Andrew - Andrew - Andrew - Company		VAL 15 SEL	
	INV TUP METERS AGL						
0,	114.		1.82		0.0		
CUL CE	**************************************	ELEV 2046	METERS		SUDMITTING T		
DATE 11/08/76				<u>,</u>		VAL 15 SEC	•
INV BASE MÉTERS ÁGÉ	INV TUP METERS AGL	· (DEG	C)/100M	DT/DZ	G C)/100M	,	`
V.	38,		0.24	,	0.0		
COL CE	**************************************	ELEN SOAS	METERS		SHONDING I		***
DATE 11/08/76	TIME 14:30MST			•		VAL 15 SEC	
INV BASE METERS AGL	METERS AGL	(DEG	C)/100M	D1/DZ .(DE			
76.	114.		0.0		-0.84		
COL CE	1 ************************************	ELEV 2046	PETERS		Showbing I	A 2122	
	TIME: 07:15MST						•
INV BASE METERS AGL	METERS AGL	(DEG	C)/100M	DT/DZ	G C)/100M		
38,	152.		0.09		-0.50		
CUL CE	**************************************	ELEV SO45	2 METERS	,	SUNDING 1	0 3100	
	TIME 14:00MST						•
INV BASE METERS AGL	INV TUP METERS AGE			DT/DZ	G C)/100M	•	
0.	,		0.0		.0.0		
COL CI	**************************************	FFFA 500	e metero		วกัดหกับหล	U 3147	
	TIME OB: 15MST						
INV BASE METERS AGL	INV TUP METERS AGL	(DEG	C)/100m	01/02	G C)/100M		
58.	768.		89.0		-1,55		



```
DUU 1] (- 10 -
                                                             5147
DATE 11/12/16 TIME 15:59051 ASCENT MATE 500 FP1 DATA INTERVAL 15 SEC.
                 TETERS AGE
                              INV D1/02
(DEG C)/100M
    INV BASE
                                           DIVUZ BELDA INV
                                            (DEG 6)/100M
   METERS AGE
                    36
                                    0.50
                                                    0.0
 CUL CB TRACT ELEV 2042 NETERS SOUNDING ID 5148
            TIME 08:30MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.
DATE 11/15/76
    INV BASE
                 INV TUP
METERS AGL
                                            DINDZ BELUM INV.
                                INV DT/DZ
   METERS AGL
                              (DEG C)/100M
        38.
                      191.
                                    U.25 .
                                                   -0.70
 DATE 11/15/76 TIME 14:30MST
                            ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.
                 INV TUP
METERS AGL
                               INV DT/DZ
(DEG C)/100M
                                           DT/DZ BELDW INV
    INV BASE
   METERS AGL
                     38.
                                   0.0
        U.
                                                    0.0
    *******************
        CUL CB TRACT ELEV 2042 METERS SOUNDING ID 3150
DATE 11/16/76 TIME 08:30MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.
   INV BASE
METERS AGL
              - METERS AGE
                               INV DT/DZ
(DEG C)/100m
                                           DT/DZ BELOW INV
                     114
                                                   -U.26
        76.
                                   0.0
                           ELEV 2042 METERS .
        CUL CB TRACT
                                                 SUUNDING ID 3145
DATE 11/16/76 TIME 14:50MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.
         THERE ARE NO INVERSION BASES WITHIN 1500M OF THE SEC
          LAYER BASE
                        LAYER TOP
                                          DI/DZ
          METERS AGL
                                     (DEG C)/100M
                        METERS AGL
                             100.
                                          -4.12
               100.
                             250.
                             500 ._
                                          -0.88
-0.98
-0.98
-1.01
               250.
                             750.
               500.
                            1000.
               750.
              1000.
                            1500.
                    SUUNDING ID 3146
       CUL CB TRACT
DATE 11/18/76 TIME 08:30MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.
   INV BASE
METERS AGE
                 METERS AGE
                               1NV DI/DZ DI/DZ BELUM 1NV (DEG C)/100M
        0.
                                                   0.0
                     267.
                                   1.00
                      COL CH TRACT
                                                 SUUNDING ID 3143
DATE 11/18/76 TIME 12:40MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.
                                           DINDS REFOR INA
                 INV TOP
METERS AGE
                                 SOLLO ANT
    INV BASE
                               COEG C)/100M
   METERS AGE
                    1255
                                                   -1.57
      174.
                                   0.19
```

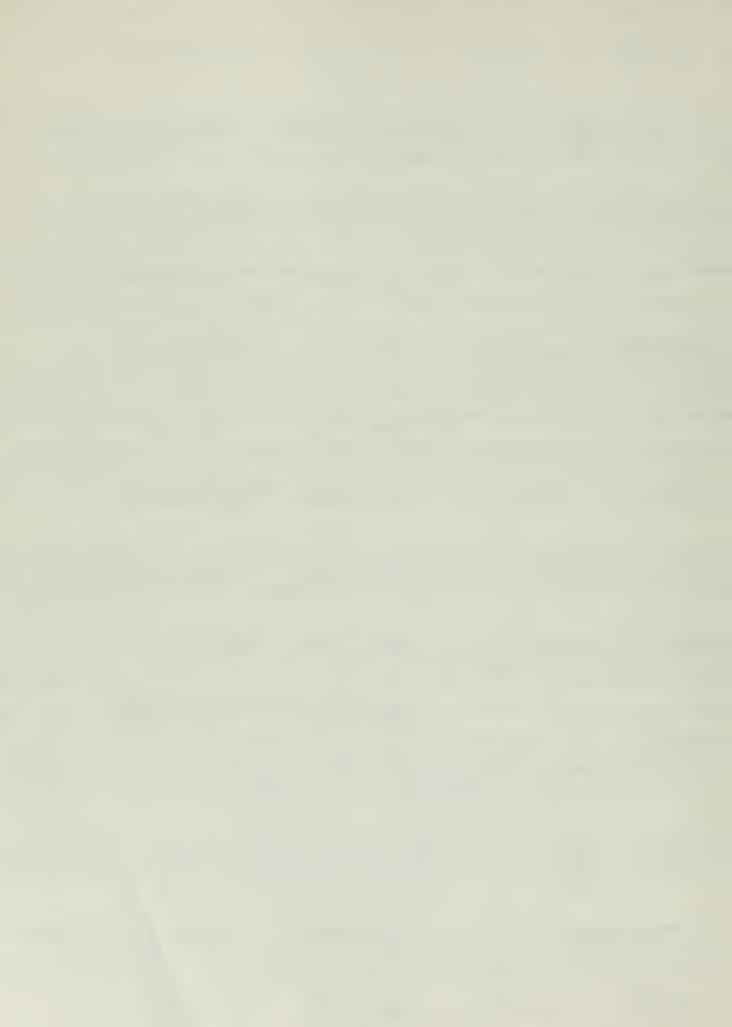
1111 2006 FILES

TUL (D) HALL

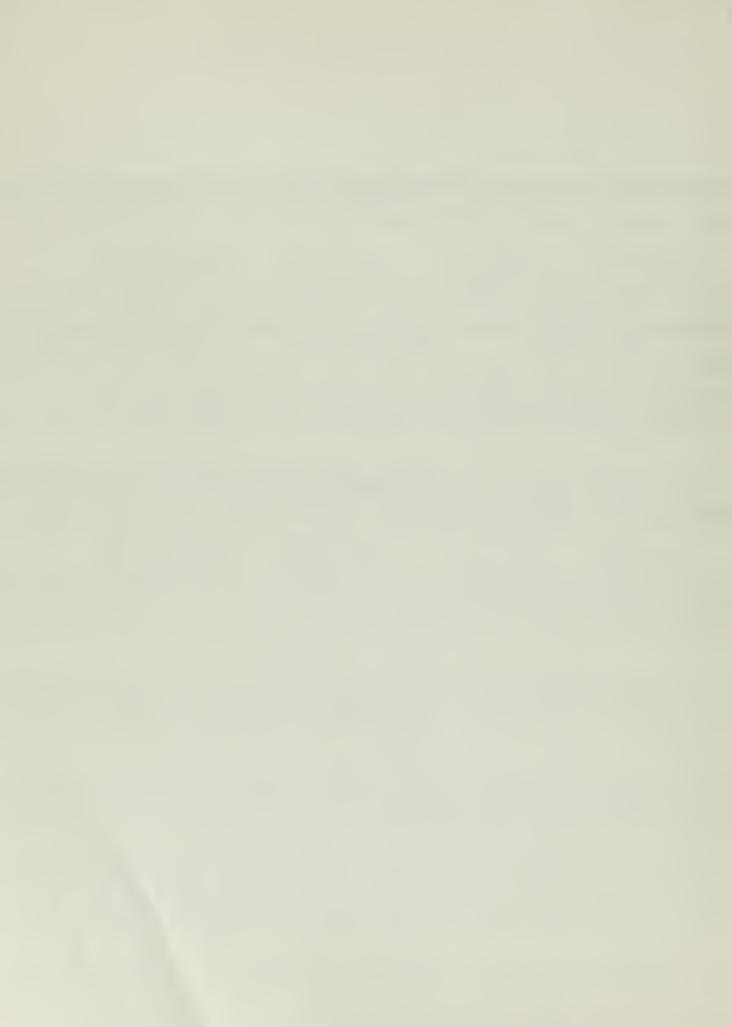


```
(ut (: ) at !
DATE 11/19/76 TIME 07:50 81
                            ASCENT RATE 500 FFM DATA INTERVAL 15 SEC.
                   1 m. V T1112
                          TOUR STAND UTANZ HELLIM INV
    INV HASE
   PETERS AGE TIETERS AGE
                                                    0.0
                                    0.87
                     229.
         0.
COL CO TRACT A ELEV 2042 METERS SOUNDING ID 314
                                                SUUNDING ID 3142
DATE 11/19/76 TIME 12:30MST ASCENT HATE SUD FPM DATA INTERVAL 15 SEC.
                 INV TUP INV DT/DZ DT/DZ BELUM INV METERS AGL (DEG C)/100M (DEG C)/100M
    INV BASE
   METERS AGL
                    864.
                                    0.0
                                                   -1.09
       846.
CUL CH TRACT ELEV 2042 METERS
DATE 11/22/76 TIME 07:20MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEL.
   INV BASE INV TUP
METERS AGL METERS AGL
                               TINV DI/DZ DT/DZ BELUW INV
                                                    0.0
                                    0.46
                     267.
         0.
                          ELEV 2042 METERS SOUNDI
                                                 SUUNDING ID 5140
        CUL CH TRACT
              TIME 13:45MST ASCENT RATE SOU FPM DATA INTERVAL 15 SEC.
DATE 11/22/76
                 INV 10P INV DT/DZ DT/DZ BELDA INV METERS AGL (DEG C)/100M (DEG C)/100M
   INV BASE
METERS AGL
                                                   -1.07
                                    0.50
                     152.
       114.
 SDUNDING ID 3136
                          ELEV 2042 METERS
DATE 11/24/76 TIME 08:30MST ASCENT HATE 500 FPM DATA INTERVAL 15 SEC.
   INV BASE TINV TUP INV DI/DZ DT/DZ BELLIW INV METERS AGL METERS AGL (DEG C)/100M (DEG C)/100M
                                   0.21
                                                    0.0
                   229.
                        SOUNDING IU 3138
        CUL CH TRACT
DATE 11/24/76 TIME 14:30MST ASCENT HATE SOO FPM DATA INTERVAL 15 SEC.
         THERE ARE NU INVERSION BASES WITHIN 1500M UF THE SEC
           LAYER BASE LAYER TUP DT/DZ
METERS AGL METERS AGL (DEG C)/100M
                                          -1.96
-0.81
                             100 -
                 1)
                             250.
               100.
                                          -1.00
                             500.
               250.
500.
750.
                             750.
                                          -1.03
                                          =1) 90
                            1000
                            1500.
               1000.
                     SOUNDING ID 3137
        COL CB TRACT
DATE 11/29/76 TIME 08:25MST 'ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.
                              COEG COMIDA
                                             DIVUZ BELUM INV
                 INV TUP
METERS AGL
    INV BASE
   METERS AGL
                                                  -0.98
                    485.
                                     0.20
      333.
```

200 11 6 10 2195



- 女女女	*****	*******	****	******	222
	CAF CR	TRACT	ELEV 2042 METERS	SHONDING ID COST	
DATE	11/29/76	TIME 14:30MST	ASCENT RATE 500	FPM DATA INTERVAL 15 SEC	L .
	INV BASE '	INV TUP METERS AGL	100 D1/DZ	DIVER BELUM 1NV	
	952.	1058.	0.13	-1,05	
**	****	TRACT	4****************	**************************************	***
DATE				FPH DATA INTERVAL 15 SE	С.
	INV BASE METERS AGL	INV TUP METERS AGL		DI/UZ BELUM INV (DEG C)/100M	
	76.	501.	0.15	-2.78	
			•	•	
				******	***
**1	************	**********	**************************************	**************************************	***
	CAL CR	IRALI	ETTA COAT WELLING	**************************************	
	E 11/30/76	TIME 13:39MST	ASCENT RATE 500		
	E 11/30/76	TIME 13:39MST	ASCENT RATE 500  INV DI/DZ (DEG C)/100M	FPM DATA INTERVAL 15 SE	
	INV BASE METERS AGL	TIME 13:30MST	ASCENT RATE 500  INV DI/DZ (DEG C)/100M	FPM DATA INTERVAL 15 SE  DT/DZ BELUW INV  (DEG C)/100M	



	33
	π Σ
	12.2
	$\epsilon$
	-
	3
	W
	>
è	in the second
	La V
	-
	i
	5 74
	<b>4</b> 1
	Y
	-
	D
	2
	- X
	1
è	0
	C
	7
	2
	-
	-
	Y Y
	Z
	tail
	>
	14
	!
	z
	Z
	_3
	သ
	-
	211 221
	2
	S

HULZWURTHIS CLASSIFICATION SCHEME FOR INVERSIONS MUDIFIED TO SHOW TOTAL NUMBER INSTEAD OF PERCENT

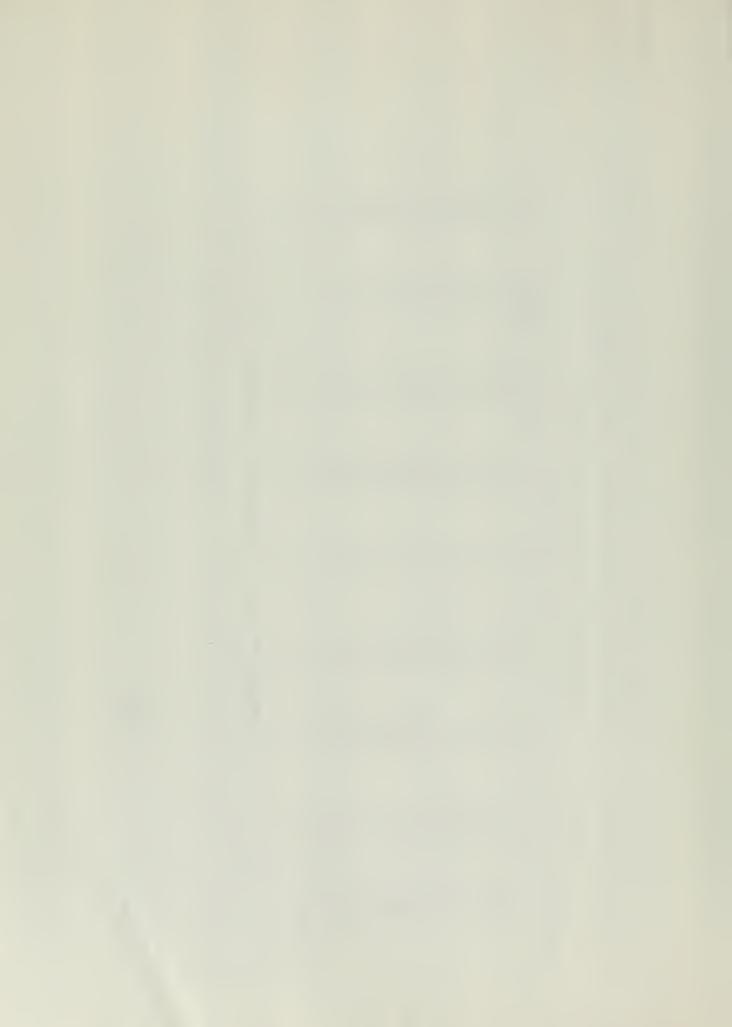
<b>リアート どうりゅう * ひょうび * * *</b>	
X	* * *
* * * 3000	1 C *
N~N * * ₩₩₩₩₩	* *
NN * * * 11	EV*
	*
4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	* *
30-003000-#30-00#30-M	* *
Z	* **
-20000000 * * * * * * * * * * * * * * * *	* 001
1. C.	* *
1	100 *
A * * * * * * * * * * * * * * * * * * *	*
5UZ * * * * * * * * * * * * * * * * * * *	100 ×
3 . * * *	*
10 x x x x x x x x x x x x x x x x x x x	* CO!
Z-0 * * * * * * * * * * * * * * * * * * *	* *
000-N000N*03*3>	- C N *
* * *	本本
72200000 * * *	* *
\$50   * * * * * * * * * * * * * * * * * *	**
* * *	* * *
	121 *
00	* DIN
AH	14 *
# # # # # # # # # # # # # # # # # # #	*



10	-
77. 37.	-
E	-
0	mon di non
2	Service or other seasons
1	-
SFC	
	Mary and address
-	
AC	
F	mary was
20	
CUL CE	-
	E
	A
70.	1
6	The same of
Y.	-
۵ لد ح	1
	de en entre parte à des entre de
	-
~	
	-
33	
HIP	
MU	-

NURMALIZEU FREQUENCY DISTRIBUTION

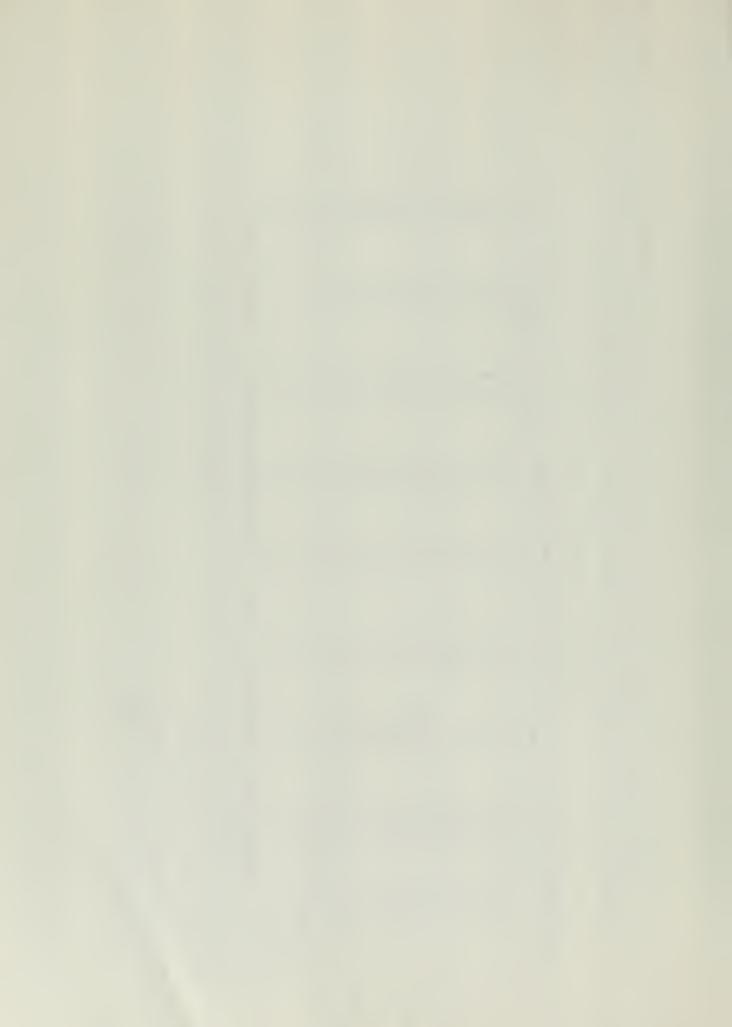
militare e pri milita estrativo qualitari e estrato de	IUIAL	0.0	•	•	•	-	*	•	) C		•		-	•	•		0.0	o•0			
Andreas dans and a security an experimental extension by the designation of the security of th	A VERAGE	0	•	•	. •	•		•	•	<b>a</b> i	•		-			•			0.0		NUT HAVE
Andreasin - Andre Space alternative strapp. It compay upon colonia.	STATE AND	0			•	•			•	•	•						0.0	0.0	CLASS IS		CUNDINGS DID
R/SEC	1 1	4	-		•			•	) c		•		-	-		•	0.0	0.0	STABILITY		S1_SOUND
	11-10	3		•				•	- - - -		•		-			•	0.0	0.0	E A ST		
SP	7-10	0 0							•	4					•	•	0.0	0.0	E UF TH	0.0	RON A SAMPI
ally adjusting the state of the	4-6	0.0	0 0	0.0		•		•	00	*	•	0	0	0	ے ت	Ω .•	0.0	0.0	TUCCURRENC	F CALM	INGS F
	5 0	0.0		0 0		0.0			30					0.0			0.0	0.0	TOUENCY TIF	FREGUENCY UF	TO SOUND
DIRECTION		Z	E N	2	ند 2 س		ند. الاستان	<b>V</b> 0	n O O	200	N S	303	₹	3 2 3	* 2	3 2	AVG SPEED	TUTAL	RELATIVE FREGUENCY	HELATIVE FRE	SOU M UF TENP A



~
x
كفا
2
_
0
2
3.0
0
-
6
M
3
i
- 1
1
A
Y
-
L.
2
7
j
4
0
7
~
T
i.i
>
.
Z
7
3
••
I
7
3
E
-

NURMALIZED FREQUENCY DISTRIBUTION

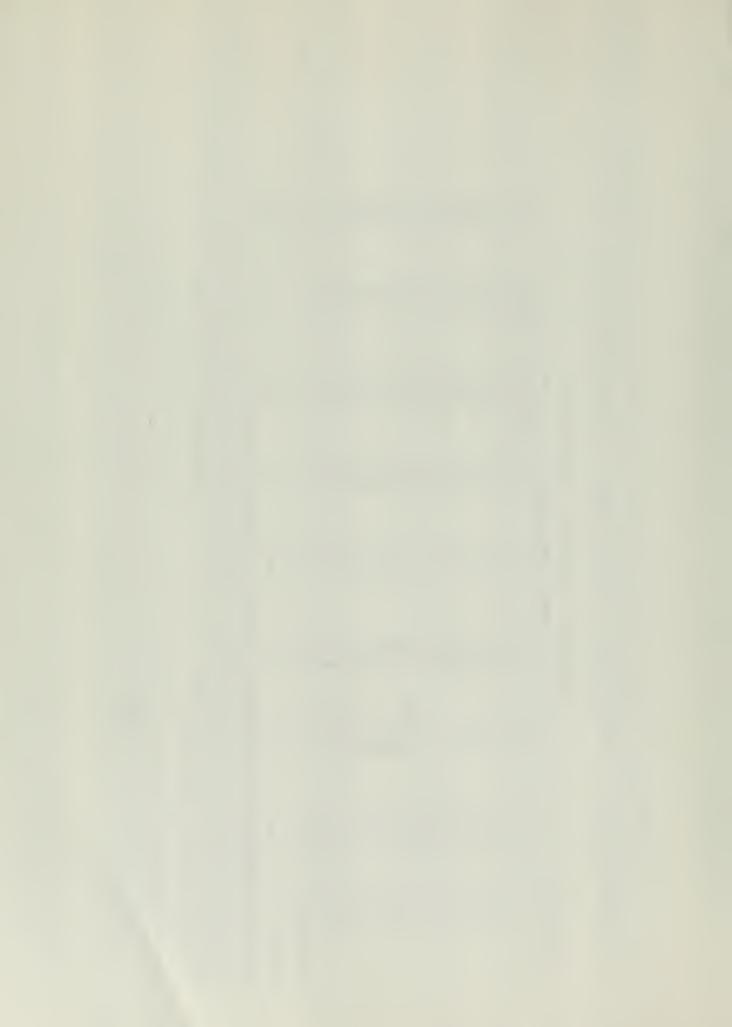
ere ken ek sedje komprekjeljejskolje er despendeljejskoljejskoljejskoljejskoljejskoljejskoljejskoljejskoljejsk	TUTAL		90	• •	-	00	• •	•		• •			•	•	0.0	1.00			
And the state of t	A VERA SERVER	•					• •	•		• •	•		•	₩-		,	0,02		NUT HAVE
	GKEA HAN HAN HAN HAN	9		• •	•	•	- «						•	•	0.0	0.0	CLASS IS		S DID
C	7		•	•		00			•	• •			•	•	0.0	0.0	TABILITY (		SI SOUNDING
ED (MET	0	*		• •		•			•			•	•		0.0	0.0	E B S		LE OF
SPE	7-10	+			•	) () ()	• •	•	•				•		0.0	0.0	NCE OF TH	0.0	RUM A SAMPLE
1	5 :	7.0		3	0.0	30	00.1	•		• •	0 0	3	) •	•	2.0	1,00	UCCURRE	CALM	INGS F
	2	4				00							<b>0</b> 0		0.0	0.0	DUENCY OF	FREGUENCY OF	P AND WIN
DIKECTION	. 4	2	3 2 2 7	14 14 14	17	ر د د د د د د د د د د د د د د د د د د د	38 38 38 38 38 38 38 38 38 38 38 38 38 3	0.00	∑ 0 ×0	₹ 9 7 7	*	3 3	2 \$ 2 Z 2		AVG SPEED	TUTAL	RELATIVE FREGUENCY	RELATIVE FRE	SUG M UF TEMP AND WINE



n	
X	
12.5	
2 4 6	
Ξ	
9	
2	
3,1	
2	
<b>(</b>	
2	
12	
0,	
- 1	
1	
5.3	
A	
Y	
-	
2	
0	
-	
3	
CD.	
U.O.	
UD.	
CD.	
יננו.	
0.00	
70, .01	
970019	
1970, .010	
1970, .019	
R: 1970, CU	
AR: 1970, CU	
(EAR: 1970, CU	
YEAR: 1970, .CU	
YEAR: 1970, CU	
4 YEAR: 1970, CU	
N YEAR: 1970. CU	
U N YEAR: 1970. CU	
1 1 14 YEAR: 1970, CU	
8 U N YEAR: 1970, CU	
- 1	
- 1	
TH: 3 U N YEAR: 1970, CU	
- 1	
UNTH	
- 1	

NURMALIZED FREQUENCY DISTRIBUTION

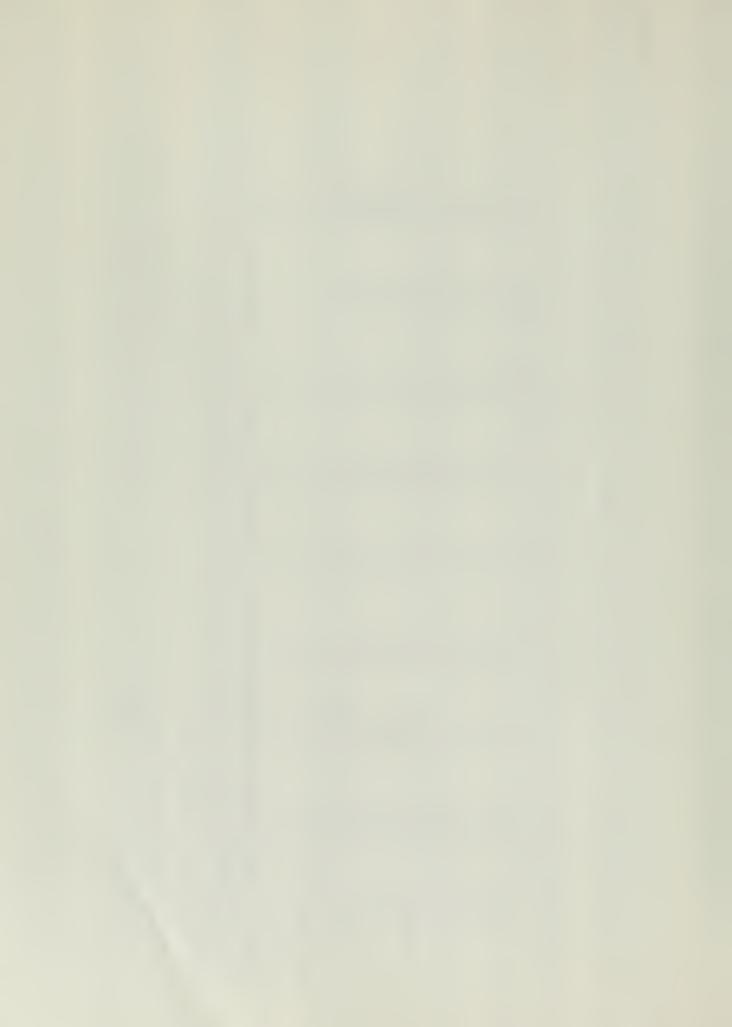
DIRECTION	e fe days - made une é canamanques e malayanguaguaguaguaguaguaguaguaguaguaguaguaguag		345	Σ	R/SEC	Padambrilla i state merphan applement padaman acciminate de	the state of the s	
	× • • •	0 = 7	7-10	11-16	17-21	CKEA HAN KE	AVERAGE SPEEDE	TUIAL
2		0.0		•	•	0.0	0	•
2 2 2	0.0	O 0 .	0.0	0.0	0.0	•		0.0
zi.	•	•	•		•	•	-	•
ئد 2 الد		ۍ ص		•	•	•		•
1	•	•	-	-	•	•	•	•
	) )	•		•				
ر ا ا		•	•			•		
ഷ ശ ഗ		•			•			
S					•	•		
えのの	•	•	•		•			J .
3.00	. 0 0					•		•
この3		0.0			•	•		•
3		0	•	- 48	•	•		•
2	0.0	•					i e	
3. Z		0.0			•	•		•
Z	•	0.0				•		
AVG SPEED	0.0	0.0	0.0	0.0	0.0	0.0		0.0
TUTAL	0.0	0.07	0.0	0.0	υ· ή	0.0		0.0
EL'ATIVE FREGUENCY	TUENCY OF	UCCURRE	ENCE OF THE	LS	ABILITY	CLASS IS	0.0	
RELATIVE FRES	FREUVENCY OF	CALM	0.0	•		•		
A TOTAL OF	TO SOUTH	S	RUM A SAMPL	40.3	S1_SUUND	SUUNDINGS DID	NOT HAVE	
U M UF TEMP	AND	V DATA						



S	
X	
<u></u>	
50.9	i
2	
$\circ$	
2	
J.T.	
~	
_	
U	
ء.	
33	
-	
2	
<b>4</b>	
I	
20	
u	
. 1	
أفسا	
9	
i	
0	
970.	
1970.	
1970	
1970.	
R 1970.	
ARE 1970.	
YEAR 1970.	
YEAR: 1970.	
YEAR! 1970.	
YEAR! 1970.	
YEAR 1970.	
YEAR! 1970.	
YEAR! 1970.	
YEARE 1970.	
VEAR! 1970.	
TEAR! 1970.	
TEAR 1970.	
S C S YEAR 1976.	
TE S S YEAR 1970.	
**	
**	
NON THE	
I ZO	

NURMALIZED FREUDENCY DISTRIBUTION

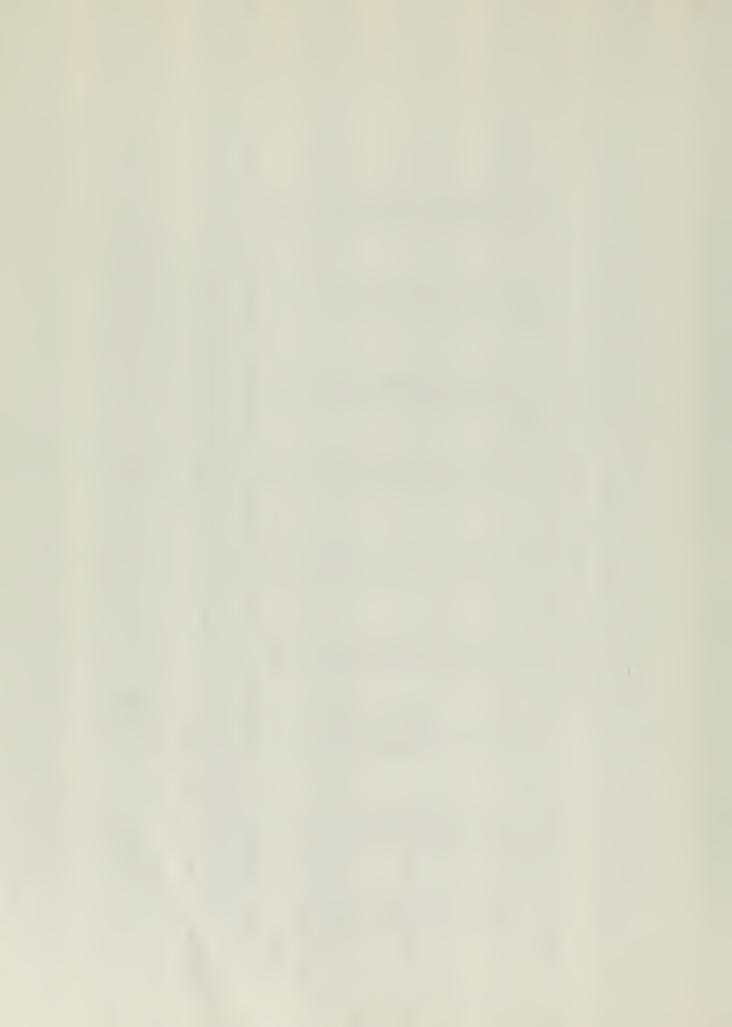
	TULAL		• •	0	): •	•	•	•	N	· •	): •	)	-	1 ~ 1 ~ 1 ~ 1 ~ 1 ~ 1 ~ 1 ~ 1 ~ 1 ~ 1 ~	0 0	•	1.00	e to manufaggadus.		
	A S S S S S S S S S S S S S S S S S S S	4	•		•	•		•				•	•					0.03		NOT HAVE
and the same and t	ANT NO		•			•	•	• •	i •					0: B	0.0	•	0.0	CLASS IS		SOUNDINGS DID
ت	-	•			•		•						•	200	17.3		0.04	TABILITY		SI SOUND
1	-		•		•	•	•		• •				•	300	15.7	•	70°0	HE D S		PLE 116
30	3		• •				•	•		0	•	0			8.2		0.15	E 0F 1	0.0	RUM A SAME
gar endelgande des returnes estados es	3 3		· · · · · · · · · · · · · · · · · · ·	0	0	9	) ()	) ()	0.12	•		⊃  €	) •	0.0 0.0	2 7	•	0.50	IF UCCURRENC	UF CALM	LINGS F
		70.0	000	0.0	0.0	က္ ( ကြင္း	3 3 3 3 3		0.12	0.04	0 · 0 ·	0 0 0	# CP CP	00 00 00 00	6-1	•	. (1,58	EUUENCY	FREGUENCY L	MP AND WING
DIRECTION	2	7.2	2	161 12 101		بر ب ب ب ب	9 SV		SS 2	30	₹ \$0 ₹	V.	2 3 3 3	2 2 2 2 2	AVG SPEED	3	TUTAL	RELATIVE FREGUENCY UF	HELAIIVE FR	Sou M UP TEMP



	-
S	The state of the s
E LER	1
ئد	1
E.	
ာ	-
0	
_	
_	
SFC 10	
is.	
л	
	A section of the sect
	-
4	
-E	1
	-
Ü	-
ن	
5	The state of the state of the state of
ن	1
	1
	-
٥	-
97	-
	1.
••	1
X	
TI.	1
>	
Z	-
	1
50	Į
8.0	Į
I	į
-	Į
9	-
2.	-
	-

NURMALIZED FREGUENCY DISTRIBUTION

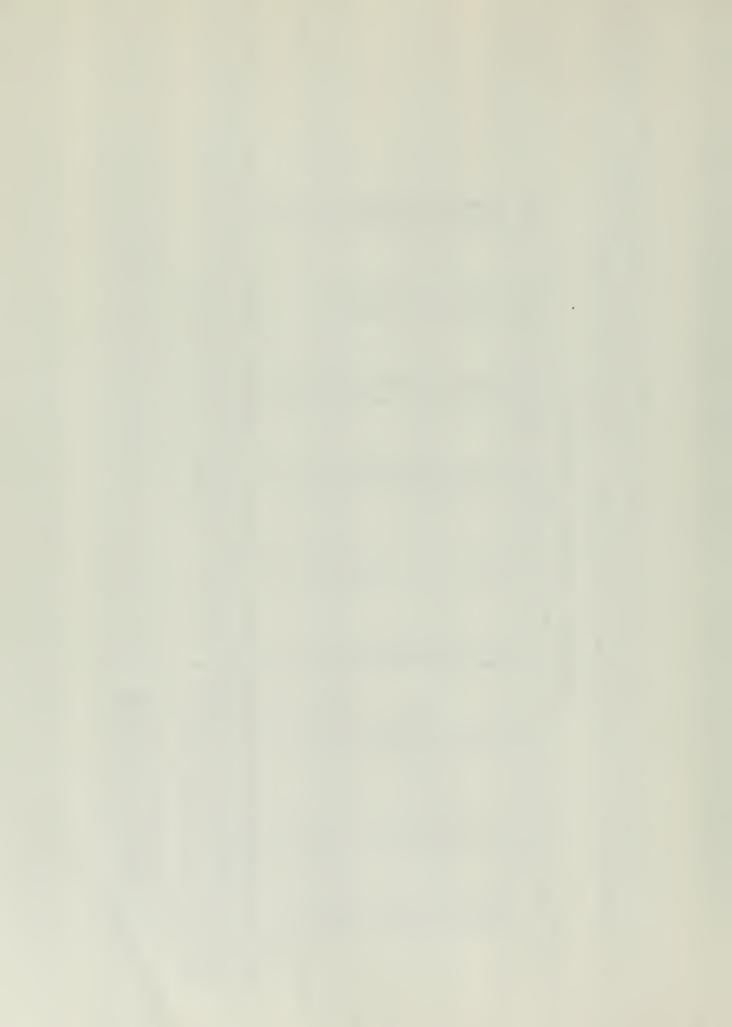
LUTAL	0.0	30	<u></u>	<b>æ</b> t	20		٥	-	) c	)  -	-1			0.0	1.00	mente antat e atribure e e deles e espera de se aspinar antata		and promote the state of the st
A A A B A B B B B B B B B B B B B B B B				-	•	o~1					•			enter at alle establis de par managemente proprié de partir une sonne de dist		D		IP NOT HAVE
GREA LER	0								•	•	•i			0.0	0.0	CLASS IS		2
ER/SEC) 17-21	0.0			-		00		•			<b>-</b> i			0.0	0.0	STABILITY		S1_SOUNDINGS
SPEED THET		•		-					•	•	464			0.0	0.0	HE E	*	PLE UF
7=10	-			-	•	; ; ;	•		•		-	•	•	0.0	0.0	ENCE DF	, n. n	RUM A SAM
4=0	0		0	4		00	0	0.07	ء ص:	3 : G :		) (C	10	3.7	0,21	DF DCCURR	UF CALM	UNDINGS F
0 - 5	0 0		0.07	0.07	ာ : ၁ :	7.00		0.07	20.0	0.0	0.0	> C	0	5.	62.0		FREGUENCY	EMP AND "
DIRECTION	Z	3 Z 3 Z Z	<u>ن</u> 2 ك	and the special control of the contr	ui Maru Lii	ა ბა ი ბა . გი	အ	SSA	33	· · · · · · · · · · · · · · · · · · ·	3 3	3 3 2	3 2 2	AVG SPEED	TUTAL	RELATIVE FREUDENCY	RELATIVE F	SOU H OF TEMP AND WINE



S
15
ند
Σ
9
3
_
u
1
-
_
AC
×
20
u
-
-
70
0
*
Ø
>
-
1
직
0
- 1
I
Z
E
Ē
1

NURMALIZED FREGUENCY DISTRIBUTION

	INIAL,	•	0.0	•		•						•			0.0			0.0	0.0	· ——in qualch day digit day		
•	AVERAGE SPEED																			0.0		NOT HAVE
A CONTRACTOR OF THE PARTY OF TH	CREALER MAN 'NER	0								4	•						•	0.0	0.0	CLASS IS		oro
2		•	0.0							4								0.0	0.0	TABILITY	9	51 SOUNDINGS
(MET	11-10	0.0	30		•	•		0.0		•		•		4	0		•	0.0	0.0	HE F S		11 E 11 E
35		0.0	0.0	•		•		- 2	•	•		•	•		_	•		0.0	0.0	E UF	-Ó • O	RUM A SAITPI
may also designed in the second of the secon	C . 77	0 0	0	•	•		• •	0			•	• •	•			•	⊃· ⊃	0.0	. 0.0	UF UCCURRENC	UF CALM	DINGS F
	5.0	0 0	0.0	0.0	0.0	1 1 1	0.0	7.0	0.0	(1 · 1)	0.0	0 0	0.0		3.0	000	7.0	0.0	0.0	1	FREGUENCY L	FEMP AND WIN
DIRECTION		Z	2	2	الد 22 14	1	iui os iui	S E	量のの	n	300	30	S S	N. Control of the Con	MIN	3.2	3 2 2	AVG SPEED	LUTAL	RELATIVE FREQUENCY	KELAIIVE FR	Soon OF TE



ാ	
7	
(X	1
_	
66 (	i
-	
Com	į
	į
<b>-</b>	
0	Ī
0	
2	
_	ł
SFC TO	
	i
س	1
1	J
ၖာ	ij
	i
	Į
	B
	ı
	ø
	Ú
-	1
U	H
4	i
~	ľ
<u> </u>	ķ
-	1
	-
122	į
חרכו	į
_	í
	i
	I
- 3	I
	ė
hand	i
	1
	i
	-
	The state of the last
	or whether the same of the party of
	A name of other party of
3	The Personal Persons in column 2 is not as the last
70.	Married Street, or other Persons and or other Persons and or other Persons and Other
70.	The Personal Persons and Perso
970.	Contraction of Street, Street, or other
1970.	the name of the latest day of
1970.	the same name of the last of t
1970.	A contract of the last of the
(1970.	The state of the s
Kr. 1970.	Comment of suppression of the Comment of Street, Stree
AK: 1970.	The state of the s
EAK: 1970.	The same and the s
YEAK: 1970.	the same and the s
YEAK: 1970.	The state of the s
YEAK: 1970.	The state of the s
YEAK: 1970.	The state of the s
YEAK: 1970.	The state of the s
YEAK! 1970.	The state of the s
YEAK! 1970.	The state of the s
YEAKE 1970.	The state of the s
YEARE 1970.	The state of the s
YEAK: 1970.	The state of the s
YEAK: 1970.	Secretaria de la constantina del la constantina de la constantina del la constantina de la constantina del la consta
N YEAK! 1970.	The state of the s
YEAK: 1970.	The state of the s
YEAK: 1970.	The state of the s
YEAK: 1970.	The state of the s
YEAK: 1970.	The state of the s
YEAK: 1970.	Manufactural international property and the second
YEAK: 1970.	Manufactural international property and the second
YEAK: 1970.	Manufactural international property and the second
YEAK: 1970.	Manufactural international property and the second
YEAK: 1970.	Manufactural international property and the second
YEAK: 1970.	Manufactural international property and the second
YEAK: 1970.	Manufactural international property and the second
YEAK: 1970.	Manufactural international property and the second
YEAK: 1970.	Manufactural international property and the second
YEAK: 1970.	Manufactural international property and the second
YEAK: 1970.	Manufactural international property and the second

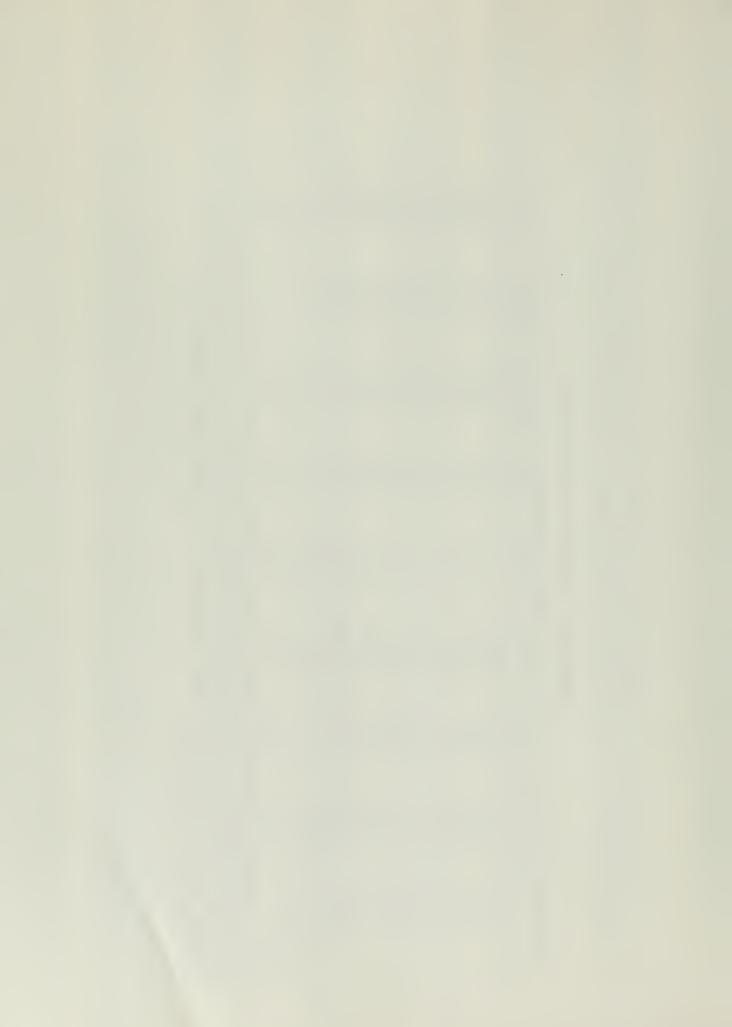
NURMALIZED FREGUENCY DISTRIBUTION

			5	はっせこと といは				
	S = 0	Q # †7	7,=10		17-21	EXENT AND	A X A A A A A A A A A A A A A A A A A A	TUTAL
	-	<u>ې</u>				0.0	0	٥.
Z Z		•	0					4
تد	: •			•				٠
LI E LI	=	٠ • •	•					<u>ે</u>
L	~ •	•	•				•	2
T.	3.7	50.0		0.0	0.0			0.05
S.	>	<b>~</b>	<u>٠</u>					) ;,
ച ഗ ഗ		20.0				•		, , 
200	다.		-	46	-		81	
≥ 000	•		•			•		√; •
200	•	> <b>*</b>	<u>ء</u>					ے •
3.0	С	٥. ت						<b>.</b>
<	9	3	0		-	4		⊃ •
₹ 2 ₹	<u>့</u>			•				<u> </u>
3 2	Э.	3	•	ુ •	7			ے •
322	<b>•</b>	9						,—i
VG SPEED	0,1	1.7	8,2	13.7	17.5	0.0		0.0
TUTAL	U.51	0,34	. 0.10	80.0	20.0	0.0		1.00

-SI-SOUNDINGS DID NUT HAVE

A TOTAL OF 10 SUBNDINGS FROM A SAMPLE OF SAU M OF (EMP AND DAID DAID

RELATIVE FREGUENCY OF CALM 0.0



Gune 1984)

From 1279-3

Gune 1984)

FN 839 .USZ W448

FN 839 .USZ W448

FN 839 .USZ W448

EDATE
LOANED
BORROWER

BORROWER

LOANED
BORROWER

# RECEIVED

SEP 1 1977

OFFICE OF

AREA OIL SMALE SUPERVISOR

U.S. G.S.